Feb. 13, 1897

1896

263-44

A.D. 1896. Nov. 30. N°. 27,219.

STEIN'S COMPLETE SPECIFICATION.

(1 SHEET)

FIG. 1.

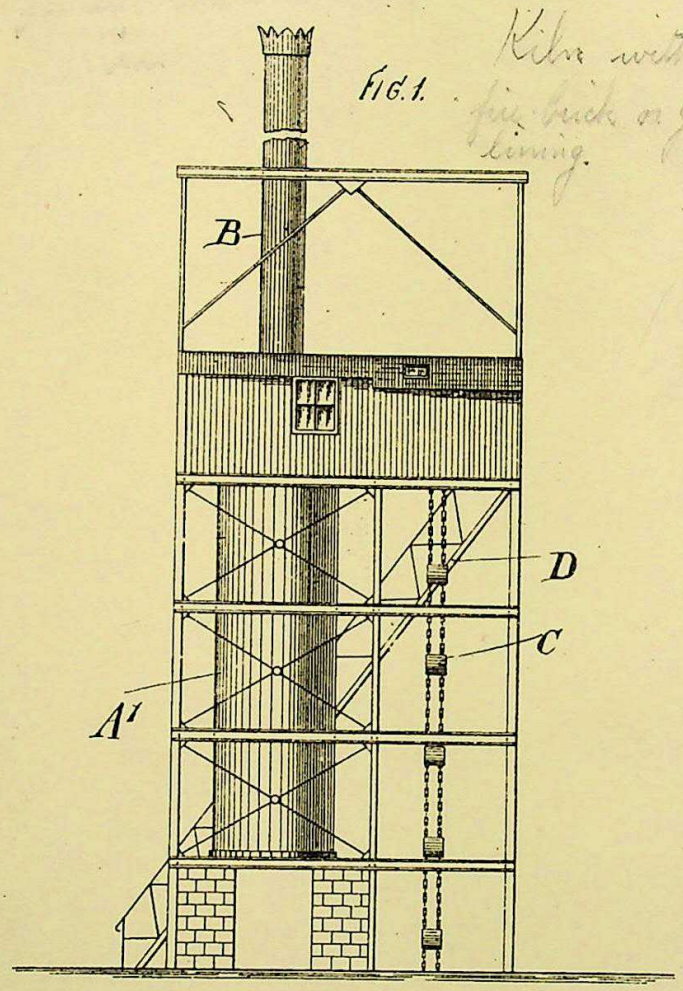


FIG. 2.

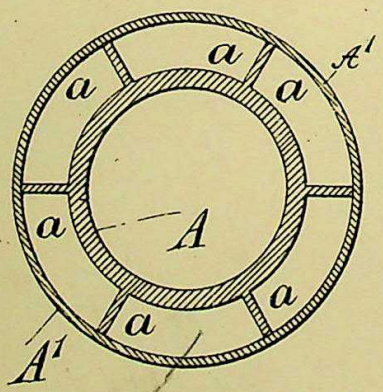
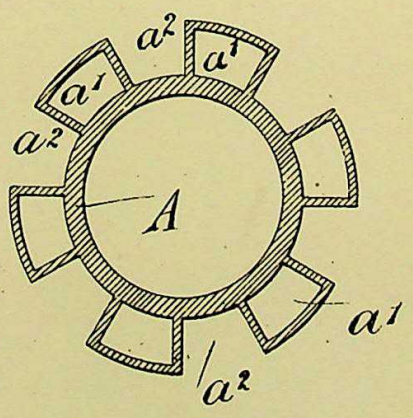


FIG. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]

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222 Hydraulic Cement & Lime Kilns 1897

222 15

N° 27,219 A.D. 1896

Date of Application, 30th Nov., 1896—Accepted, 13th Feb., 1897

COMPLETE SPECIFICATION.

DUPLICATE

Improvements in Furnaces for Burning Cement, Lime, and the like, and for Smelting Ores.

I, ALBRECHT STEIN, of Wetzlar, in the Empire of Germany, Manufacturer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the construction of a furnace which is designed for use for burning cement, lime and the like, and also for smelting ores, the arrangement being such that the inner lining of the furnace casing which is generally made of iron or steel with a fire proof material such as fire clay or ganister &c. can be dispensed with. A furnace according to this invention is formed internally with naked metal walls in contra-distinction to the ordinary burning and smelting furnaces heretofore employed, all of which require a solid lining or coating of fire-proof material inside the furnace shaft. These walls would be liable to be destroyed by the burning or smelting temperature obtaining in the furnace, if measures were not taken to provide for efficient cooling of the furnace walls on the exterior of the furnace, and it is the object of my invention while dispensing with the internal fire proof lining to effect the cooling of the furnace walls.

The invention consists in providing the outside surface of the furnace with approximately vertical air passages or channels which may be of either open gutter shape, or be closed externally, and designed to produce a strong circulation of air, and consequently an effective cooling of the furnace casing.

In the accompanying drawings,

Figure 1 is an external elevation of a furnace with framing constructed according to this invention.

Figure 2 is a cross section through the furnace, and

Figure 3 is a cross section of a modified form of the same.

The absence of any lining whatever on the internal surface of the furnace casing, has, amongst others, the particular advantage of avoiding the frequent interruptions of working which are caused by the occasional renewal and the necessary taking down of the lining for the purpose of repair. As shown in the cross section in Figure 2 (and Figure 3) in the new mode of construction of burning or smelting furnace, there is no lining whatever, so that the furnace wall A which is preferably made of iron or steel, is enabled to come in direct contact internally with the charge or contents of the furnace. Since the wall of the furnace has to withstand a temperature acting in its interior, such temperature being generally very high, the wall is formed on its outer periphery in such a manner as to present a maximum amount of cooling surface. This object is most advantageously effected by arranging on the outside of the wall a suitable number of air passages or channels *a*, *a*, Figure 2. Through these passages the natural current of air enters at the coolest point of the furnace, and in rising and by assuming a higher temperature, produces a powerful draught in an upward direction, and thus serves to effectively cool the wall of the furnace. This cooling action is so great, that for example temperatures may be produced in the interior of an iron furnace shaft constructed in this manner, which are far beyond the melting point of iron, without however, the walls of the furnace being injuriously affected thereby.

It is not necessary that the passages, such as those marked *a* in Figure 2, should

be arranged in uninterrupted series or succession around the furnace. Their succession may also be interrupted as shewn in the cross section according to Figure 3. In this case the enclosed air passages a^1 alternate with the gutter shaped passages a^2, which, on account of the radiation of their surfaces also serve to cool the furnace casing although not to such a degree as do the draught passages a^1. In fact instead of completely closed in passages, mere gutters between ribs of suitable cross sectional form may be employed. The dimensions and cross sectional shape of the air passages thus formed, are not material to the invention, which in fact can be carried out in most varied forms, so long as the object of cooling the furnace walls by means of natural draught with the help of the peculiar construction of the exterior of the walls is borne in mind.

It is preferable to construct the furnace of superposed rings or tubular parts which may if necessary be divided, and which are connected together in a suitable manner. The most suitable material for these rings, or segments fitting together to form rings, are iron or steel castings, but other materials may however be employed for this purpose. The outer enclosing wall A^1 in Figure 2 outside of the passages a is preferably made of a separate sheet metal shell or casing slipped on to the furnace.

The framing of the furnace, Figure 1, is formed in such a manner as to allow of access of air on all sides so as to aid in cooling the walls of the furnace. In Figure 1, B represents the charging tube ; C the charge elevator ; and D the staircase for giving access to the charging platform.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

(1.) A burning or smelting furnace in which for the purpose of dispensing with a lining of the shaft with fire-proof material, the furnace shell or casing (which is preferably constructed of iron or steel castings and is formed of rings or segments of rings) is provided on its exterior with closed or open channels passages or gutters, in such a manner, that by means of the draught or current of air rising up in the same, or it may be by radiation of the heat, there is produced, an effective cooling action for the purpose of preserving and prevention from smelting and burning of the walls of the furnace.

(2.) A burning or smelting furnace substantially as and for the purpose hereinbefore described.

Dated this 30th day of November 1896.

MARKS & CLERK,
18, Southampton Buildings, London, W,C., and
13, Temple Street, Birmingham, Agents.

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